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Current Status of Centrally Acting Peptides

SYMPOSIUM AT CDRI

ıe 100 scientists, including nine from tralia, Canada, France, Israel, the herlands, and USA, discussed the of centrally acting polypeptides in siology and pathology at an rnational symposium held at the tral Drug Research Institute RI), Lucknow, 15-16 July 1981. The posium, organized by CDRI in aboration with the Indian Pharma- gical Society, was spread over seven ntific sessions during which five ıary lectures were delivered and 17 ers presented.

Presenting an overview of the role of orphine in health and disease, Dr P. Bhargava (K.G.'s Medical College, cknow) stated that the discovery of cific agonists and antagonists of the oid receptors would enable a proper lysis of the modulation of pain and eal the mechanism of drug tolerance d addiction, respiratory and car- vascular functions, vomition, eu- oria and behavioural function. emical manipulation of the en- genous peptides may provide drugs clinical use, suggested Dr Bhargava.

Dr J.C. Schwartz (Neurobiology it, INSERM, Paris, France) spoke on inactivation of enkephalins by ecific enzymes, particularly kephalinase.

The current status of hormone- easing and release-inhibiting peptides the hypothalamus was reviewed by K. Kar (CDRI). According to him, synthesis and/or release of these ptides appears to be antagonized by intra-hypothalamic stores of these rmones. Available data indicate that the hypothalamic peptides act not only as neurohormones but as neuromodulators and possible neurotransmitters in behavioural homeostasis.

Describing the current trends in the design of enkephalin analogues, Dr K.B. Mathur (CDRI) said that the main features in such designs are the protection of the N- and C-terminii of enkephalin from enzymatic degradation, enhancement of the receptor binding affinity, improvement of transport properties and of the ability of the peptides to cross the blood-brain barrier. He reported the synthesis of some very potent and stable enkephalin analogues.

The pharmacology of new analogues of Met-enkephalin synthesized at CDRI was discussed by Dr G.K. Patnaik. These were quite resistant to metabolizing enzymes, were active both orally and parenterally and could cross the blood-brain barrier, possessed marked analgesic activity in mice, and had a long duration of action. One of the compounds was about 25,000 times as active as Met-enkephalin and 178 times as active as morphine.

The role of enkephalin in regulating blood pressure and control of body temperature was discussed by Dr R. Raghubir and Dr R.C. Srimal (both from CDRI). Dr Raghubir's work indicated a greater involvement of delta-receptors in the vasomotor modulatory response of Met-enkephalin, perhaps due to potentiation of the acetylcholine response. Dr Srimal suggested that the endogenous opioid Met-enkephalin plays a role in central thermoregulation in the desert rat and that there is cross-tolerance between morphine and naturally occurring ligands of opiate receptors.

Dr F. Bergmann (Department of Pharmacology, Hebrew University, Jerusalem) presented evidence for the involvement of opioid peptides in blood pressure regulation and in some hypotensive reactions.

CSIR TO SET UP A NEW NATIONAL LABORATORY

It is proposed to set up under the auspices of the Council of Scientific & Industrial Research a National Institute for Microbial Technology and Genetic Engineering. An expert committee headed by Dr M.L. Dhar, former Director of the Central Drug Research Institute, Lucknow, has been constituted with the following terms of reference: (i) to identify thrust areas of basic research and technological development in the proposed institute and to draw up a charter of its aims and objectives; and (ii) to identify the requirement of staff, major equipment and buildings, to recommend a suitable site or alternative sites, and to estimate financial inputs for the institute. □

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The fluorescence behaviour of Met-enkephalin is greatly dependent on the dielectric constant and *p*H of the medium and that polarity and *p*H of the medium influence the conformation of the pentapeptides, according to Dr M. Atreyi (Chemistry Department, Delhi University, Delhi).

Dr J.J. Ghosh (Department of Biochemistry, University College of Science, Calcutta) reported that addition of beta-endorphin *in vitro* as well as of blood plasma from electroacupuncture-treated rats decreased the normal RBC membrane-bound Ca^{2+}-ATPase. He suggested that a beta-endorphin-like substance is released by electroacupuncture.

Discussing the role of Met-enkephalin and Substance P on acetylcholine release in brain, Dr B.V. Rama Sastry (Department of Pharmacology, Vanderbilt University, Nashville, USA) observed that enkephalin exerts a negative feedback control of acetylcholine from cerebral slices of mouse by inhibiting Ca^{2+} uptake. And Substance P exerts a positive feedback on the acetylcholine release by enhancing the uptake of Ca^{2+}. Dr B.R. Sastry (Department of Pharmacology University of British Columbia, Vancouver, Canada) also indicated that Met-enkephalin, beta-endorphin and Substance P may be involved in modulating the action of the cholinergic pathways of rat interpeduncular nucleus neurones.

Dr M.G. King (Department of Psychology, University of Newcastle, New South Wales, Australia) suggested that the stereogenic action of the peptides arginine-vasotocin and of alpha-melanocyte-stimulating hormone are mediated through the neurotransmitter serotonin.

Dr Joy David (Ciba-Geigy Research Centre, Bombay) and Dr M.R. Dzoljic (Department of Pharmacology, Erasmus University, Rotterdam, the Netherlands) provided evidence for the important role of opiate receptors in certain types of epileptic seizures. Dr Dzoljic also indicated the need to define further the biological role of the opiate receptor and to identify potential delta-opiate receptor-acting drugs, which might provide a new approach to the therapy of some seizure disorders.

Dr K.S. Dixit (K.G.'s Medical College, Lucknow) presented his work on the involuntary central cholinergic and enkephalinergic receptors involved in krait venom poisoning. As atropine and naloxone were found to counteract the toxicity of the venom, Dr Dixit suggested that these might be useful in the treatment of snake bites.

Describing the anti-arrhythmic activity of some enkephalin analogues, Dr K.K. Pant (CSIR Neuropharmacology Unit, K.G.'s Medical College, Lucknow) reported that the enkephalinergic neurones in the spinal cord inhibit coronary ligation-induced cardiac arrhythmia in dogs.

Several papers dealt with the role of opioid peptides in behavioural processes. Dr A. Ray (Department of Pharmacology, University College of Medical Sciences, New Delhi) suggested that there is a difference in endogenous opiate activity in aggressive and non-aggressive behaviour.

The symposium was inaugurated by Dr C.R. Krishna Murti, Director, Industrial Toxicology Research Centre, Lucknow. [*Report by Dr G.K. Patnaik of CDRI's Pharmacology Division*] □

Semiconductor Device Technology

WORKSHOP AT CEERI

Recommendations aimed at an accelerated development of the semiconductor industry in India on a firm base of research, development and design were made at a national workshop on Semiconductor Device Technology held at the Central Electronics Engineering Research Institute (CEERI), Pilani, 24-28 August 1981. Participants at the workshop, organized by CEERI in collaboration with the Electronics Commission, included experts from both research institutions and industry, like the Solid State Physics Laboratory, Bhabha Atomic Research Centre, Indian Institutes of Technology, universities, Bharat Electronics Ltd, Electronics Corporation of India Ltd and Bharat Heavy Electricals Ltd.

Through one of the recommendations, the workshop called for cooperative efforts among different centres of semiconductor research especially in the area of VLSI. Through another recommendation, it called for provision of sufficient funds for work on development of materials technology and for characterization, design, fabrication and testing of integrated circuits, particularly LSI and VLSI, as a national priority. The importance of evaluation of the activities in these areas was also underscored.

Provision should be made, the workshop suggested, for those scientists concerned with semiconductor devices to visit relevant centres in India regularly, and even centres abroad occasionally.

Also recommended was the setting up of a working group, consisting of authorities in semiconductor research and application in order to identify the needs for specific developments on a priority basis in accordance with national requirements. The committee would also recommend allocations of specific tasks to organizations which are prepared and are able to participate in a collaborative programme.

The Department of Electronics and CSIR, the workshop noted, had already decided to form a working group which covers, among other areas of electronics, the above-mentioned field, for defining priorities and preparing an action plan. □

RRL-Jammu commissions turpentine fractionation plant for industry

Turpentine oil produced in Jammu & Kashmir State can now be processed inside the state itself to get value-added products and thus can bring in better economic returns to the state, largely due to the fractionation technology which the Regional Research

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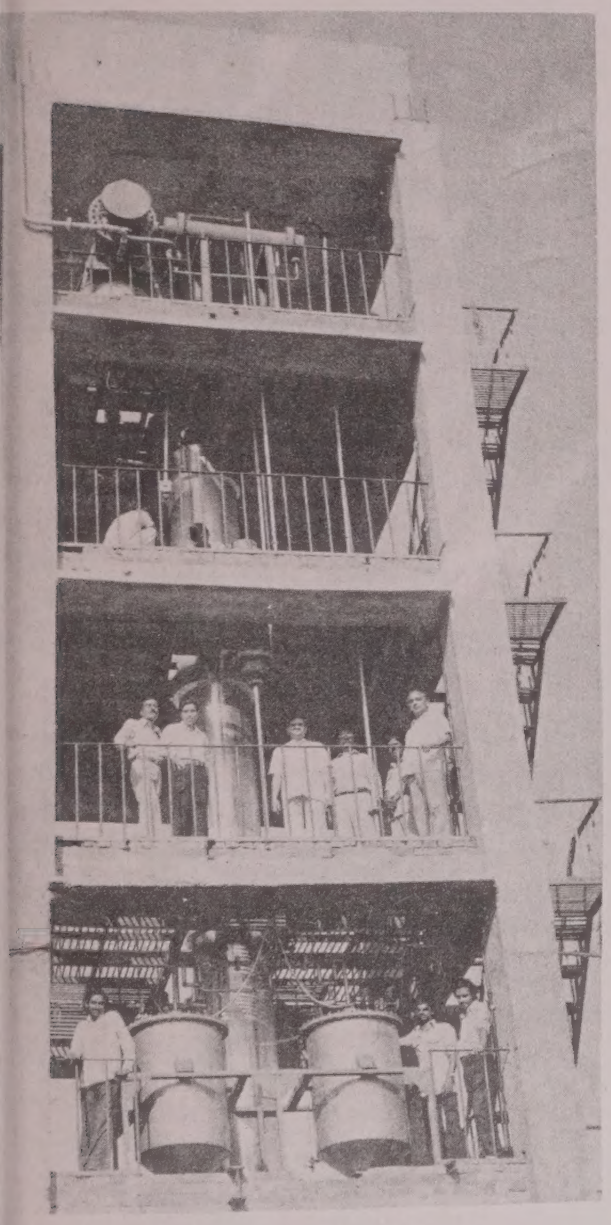
aboratory (RRL), Jammu, has de-eloped and effectively transferred to ndustry. Till now, turpentine oil was ot being utilized within the state for its ownstream products and was going ut for fractionation into value-added onstituents like α-pinene, β-pinene, +)-car-3-ene and longifolene, which in urn are extensively used in making erfumery chemicals and other valuable roducts.

Following the development of frac-ionation technology, the laboratory designed and fabricated for Jammu Pine Industries a plant with a capacity to fractionate 8 lakh litres of turpentine per annum. The plant was installed and commissioned at Gangyal, Jammu, in August under the supervision of RRL-Jammu engineers.



Fractionating column for fractionating turpentine oil installed and commissioned by RRL-Jammu for Jammu Pine Industries. It is for the first time that value-added fractions of turpentine are being produced in the small-scale sector of this region. So far this technology was the monopoly of large houses.

Fabricated with indigenous equipment, machinery and components and based on specifications provided by the laboratory, the entire plant cost about Rs 25 lakh. It is producing since the day of trial run high-purity α-pinene, α- & β-pinene, carene, etc.

The laboratory has also demonstrated to the firm the production of terpineol, terpine hydrate and carene acetate.

Earlier, complete technology for the manufacture of ester gum, maleic rosins, alkyd resins, etc. was given to Sud Pine Industries, a sister concern of Jammu Pine Industries, who are successfully running their plant at Rishikesh. □

Polymer Membranes for Use in Industrial Waste Treatment

Reverse osmosis (RO) membranes useful in the treatment of industrial effluents have been prepared by using indigenously available cellulose triacetate in place of the conventional cellulose diacetate membranes. The researcher was Shri Jagdishkumar D. Nirmal, a CSIR research fellow, who worked under the guidance of Dr V.P. Pandya at the Central Salt & Marine Chemicals Research Institute, Bhavnagar.

A salient feature of the preparation of the RO membrane is the elimination of heat treatment. The membrane gave a salt rejection of about 93% and a flux of 10 gfd. The membranes were useful in the expanded *p*H range of effluents which otherwise had to be maintained around 5 to 6—the range suitable for conventional diacetate membranes. The performance of the cellulose triacetate membranes in the treatment of effluents from electroplating, fertilizer and textile industries was found satisfactory.

Shri Nirmal has been awarded Ph.D. degree by the Saurashtra University for his thesis based on the studies. □

Synthesis, Characterization and Uses of Some Inorganic Ion-exchangers

Four inorganic ion-exchangers, viz. $K_2Zn_3[Fe(CN)_6]_2 . xH_2O$, $Cu_2[Fe(CN)_6] . xH_2O$, $Ni_2[Fe(CN)_6] . xH_2O$ and $Mn_2[Fe(CN)_6] . xH_2O$, have been synthesized and characterized by Kum. Trupti N. Dave, Senior Scientific Assistant, who carried out the studies under the supervision of Dr V.P. Pandya at the Central Salt & Marine Chemicals Research Institute, Bhavnagar. These complex salts showed selectivity towards alkali metels; selectivity towards caesium (137) was as high as 80% of the theoretical value based on structure. A significant aspect of the work was the use of $K_2Zn_3[Fe(CN)_6]_2 . xH_2O$ in separating caesium from rubidium by a suitable adjustment of nitric acid concentration.

Attempts were made to recover uranium from sea water; 10.02 mg of uranium could be obtained from 3000 litres of sea water, with a recovery of 73.5% by using hydrated titanium oxide coated on a polystyrene sheet.

Kum. Dave has been awarded Ph.D. degree by the Bhavnagar University for her thesis based on the study. □

NGRI detects micro-earthquake activity around Srisailam Dam area

After the occurrence of an earthquake of magnitude 3.5 on 10 October 1979, which had its epicentre 10-15 km away in the northeast direction of Nagarjuna Sagar Dam, there was a felt need for seismic surveillance in the vicinity of the Nagarjuna Sagar and Srisailam dams. Hence the setting up of seismic stations, one at each of the dams, was considered important specially when the Srisailam reservoir was to be filled shortly, so that changes in seismic activity before and after the impounding of the reservoir could be compared. A seismic station in Srisailam, 60 kg upstream of Nagarjuna Sagar on River Krishna, was started in February 1981. Another in Nagarjuna Sagar area is expected to be started soon. Until September end no seismic

activity had been observed close to the reservoir, which had been filled in July. However, micro-earthquake activity in the nearby areas has been detected and needs to be closely watched.

Investigations of reservoir-induced seismicity have assumed importance after the devastating Koyna earthquake of 10 December 1967. The activity at Koyna is still continuing. Damaging earthquakes have also occurred after the filling of other large dams elsewhere in the world, the main ones being Kariba in Zambia, Kremasta in Greece, and Hsinfengkiang in China. There are over three dozen such examples from all over the world where initiation and/or enhancement of seismicity has been reported subsequent to reservoir impounding. The NGRI team, Dr Harsh K. Gupta and Dr B.K. Rastogi, have made detailed investigations of such activities. These have revealed certain common characteristics of reservoir-induced seismicity which distinguish them from the normal seismicity (not associated with reservoirs) of the concerned regions. The NGRI scientists have also studied the mechanism by which earthquakes are triggered by the filling of large reservoirs.

It may be mentioned that Dr Gupta and Dr Rastogi have authored a book titled 'Dams and Earthquakes' (Elsevier Scientific Publishing Co., Amsterdam) in which they have incorporated their findings. So useful a reference work, it has been translated into Russian. □

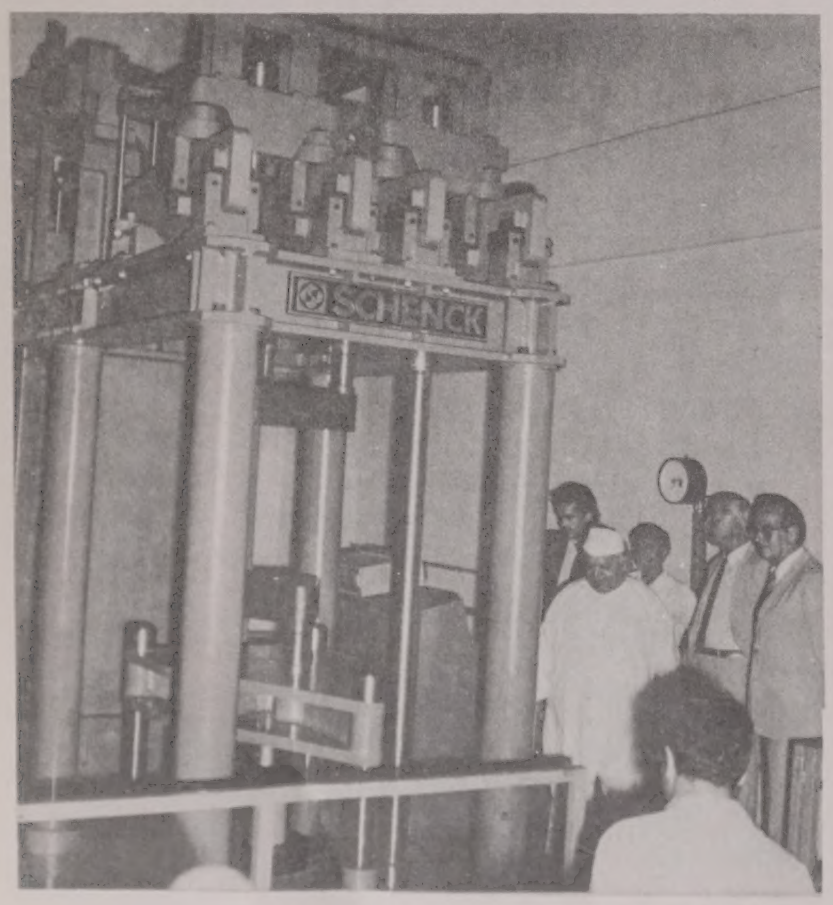
Force Standard Facility Inaugurated at NPL

At a formal function held at the National Physical Laboratory (NPL), New Delhi, on 29 September 1981, a one meganewton (MN) force standard facility was inaugurated by CSIR's Vice President Prof. S. Nurul Hasan. Federal Republic of Germany, through whose aid under the Indo-German Technical Cooperation programme in metrology the force standard was donated to NPL, was represented at the function by Ambassador H.E. Rolf Ramisch.

The force standard is used for calibrating electromechanical load cells and force-measuring devices. The importance of measuring forces accurately need hardly be emphasized in engineering applications where determining the strength of materials by testing machines is of vital importance, and without a standard force-measuri facility, load cells and proving rin cannot be calibrated. Furthermore, t importance of measuring forces wi great accuracy extends to the fields aeronautical engineering, space r search, and chemical process control.

The force standard facility commi sioned at NPL is a deadweight cum leve multiplication type, i.e. a machine whic can select and apply masses to giv various force steps (deadweight ma chine) combined with a facility (leve multiplication) to magnify a compara tively small force of the deadweigh through levers so that forces of muc higher magnitude can be generated. Th NPL force standard has a deadweigh capacity of 100 kN (about 10 tonnes with an accuracy of ±0.002%; the deadweight can be multiplied by a lever to generate a force of 1 MN (about 100 tonnes) with an accuracy of ±0.01%.

The machine (cost, DM 2 million/Rs 80 lakh), installed on a special vibration-free basement in a specially constructed building, is the only one of its kind in this region. The facility is available for use by other neighbouring countries. NPL, it may be mentioned, has a statutory responsibility for the custody, development and maintenance of



(Left)—Prof. S. Nurul Hasan inaugurating the 1 MN force standard. (top)-A view of the control panel of the force standard facility; Shri M.K. Das Gupta, Scientist in charge of force standard, explaining its working to the CSIR's Vice President and H.E. Rolf Ramisch, FRG's Ambassador to India (extreme right)

ational standards of measurement of ll physical parameters—primary as vell as derived—at internationally ccepted levels of accuracy.

During the course of the Indo-German Technical Cooperation programme, which started in 1975 and concluded in 1981 (June), one NPL scientist was trained in Germany for a year and two German experts from Physikalisch-Technische Bundesansalt (PTB) were with NPL for three months. Of a total quantum of FRG aid to India amounting to DM 3.8 million (about Rs 15.20 million), NPL received DM 2.8 million (about Rs 12 million). □

Microbial Enzymes for Manufacture of Alternative Sweeteners

Fungal cultures which produce extracellular enzymes capable of converting tapioca starch to glucose with 90% efficiency have been isolated by the Central Food Technological Research Institute (CFTRI), Mysore. The enzymes are used for the production of glucose syrups by a process developed by CFTRI, which has also isolated potent bacterial cultures which convert glucose to fructose in starch hydrolysates. Tapioca starch based high-fructose has been prepared on 2 kg per batch scale.

An estimated 15 tonnes of high-fructose syrup (dry weight basis) could be obtained from topioca starch from a hectare of land as against only 5 tonnes of cane sugar. As starchy and cellulosic substrates are widely available in the country, the CFTRI's technology when industrially exploited holds great promise of lessening the demands on the conventional sugar resources. □

PROGRESS REPORTS

NML Annual Report: 1979-80

As many as 39 research investigations were completed and reports in respect of them prepared, according to the annual report of the National Metallurgical Laboratory (NML), Jamshedpur, for the year 1979-80, published recently. In a project sponsored by the Metallurgical & Engineering Consultant (India) Ltd, NML successfully completed bench-scale investigations on the beneficiation of two low-grade oolitic iron ores from Syria and took up pilot plant investigations to help MECON set up an iron and steel complex in that country. Following comprehensive pilot plant beneficiation studies on low-grade ores received from both public sector and private sector undertakings, NML developed process flow-sheets for the setting up of a number of ore treatment plants. These included: (1) beneficiation and agglomeration of Gandhamardan iron ores for Orissa Mining Corporation; (2) Saladipura pyrite beneficiation plant for Pyrites, Phosphates and Chemicals Ltd; (3) coal flotation plants for treatment of coal fines and middlings at Nandan, Damma, Bolanda and Jagannath collieries of Central Mine Planning & Design Institute, Ranchi; (4) fluorspar beneficiation plant of 36 tonnes per day capacity at Chandidungri, Madhya Pradesh, for the Madhya Pradesh & Maharashtra Minerals & Chemicals (P) Ltd; (5) ferruginous manganese ores beneficiation plant for Tata Iron & Steel Co. Ltd; (6) chromite beneficiation plant for Ferro Alloy Corporation; and (7) kyanite-sillimanite plant for Development Consultants (P) Ltd.

An international collaborative project on atmospheric corrosion of metals and alloys has been taken up with the National Research Institute for Metals, Tokyo. The first stage of the project will be confined to the study of the extent of corrosion of different engineering materials and its correlation with atmospheric variables.

In the second phase will be developed anticorrosion measures, both durable and economically viable, for protecting structural members.

The laboratory has taken up a turn-key project to set up a 1 tonne per day pilot plant for production of ferro-tungsten by alumino-thermic reaction for the Central Research Organisation, Rangoon, on behalf of the National Research Development Corporation of India, which is implementing the project under the Indian Technical and Economic Cooperation programme.

During the year under report, NML transferred to industry through the National Research Development Corporation of India six processes all of which went into commercial production. One of them is the technology for production of the versatile electric-grade aluminium alloy NML-PM2 which was transferred to Universal Cables Ltd, Satna. With a view to using annealed NML-PM2 steel-reinforced conductors the Rural Electrification Corporation placed an order for 30 km of the conductor with the Indian Aluminium Cable Ltd, NML's licencee, for conducting field trials.

Studies were under way to improve the electrical conductivity of NML-PM215 alloy to meet the requirements of grooved contact wires used in railway electrification.

In aluminium technology, the laboratory has developed the alloy melting and solidification technology using the concept of filtering the molten metal through a bed of refractory. Furthermore, it has developed towards this end a reactive filter which has eventually been transferred to industry. For repair welding of aluminium alloy castings including aircraft components, the NML-developed filter wires and rods have been found to be satisfactory. Aluminium alloy based bearings on evaluation by the Research, Design & Standards Organisation, Lucknow, have been found to be as good as conventional bronze bushes, as a result of which there is considerable scope for substituting copper by the aluminium alloy.

The laboratory also interacted with small-scale industries to improve their product quality as also productivity. One such interaction was with utensil manufacturers as a result of which rejection percentage in finished utensils was brought down.

The laboratory filed five patents relating to: purification and enrichment of low-grade molybdenum concentrate and improvements thereof, sulphation of copper sulphide concentrates, and improvements for recovery of tin metal from tin scruffs. □

Vanillin: Toxicological Data Profile

The Industrial Toxicology Research Centre, Lucknow, has brought a compilation titled 'Toxicological data profile on vanillin'.

Used principally as a flavouring agent in foods and beverages, vanillir is rated moderately toxic with a probable oral lethal dose in humans varying from 500 mg/kg to 5000 mg/kg. What the booklet reveals is that while vanillin is almost completely metabolized in the adult humans and excreted through urine, in infants complete biotransformation does not take place. Hence appears the need to eliminate all flavours or flavour enhancers in infant formulae. Furthermore, consumers are not so much prone to the harmful effects of vanillin as are the manufacturers who use vanilla pods as the starting material.

Compiled under a project funded by a synthetic foods manufacturing firm, the booklet contains capsuled information on various aspects of the flavouring agent such as functional uses, production processes, and metabolism with focus on its toxicological effects. Contains 381 references, 132 of which have been consulted.

Enquiries regarding the publication may be addressed to the Director, Industrial Toxicology Research Centre, Lucknow 226001. □

Rural Aquaculture

TRAINING COURSE

The Regional Research Laboratory (RRL), Jammu, organized a UNICEF-sponsored training course in Rural Aquaculture from 1 to 31 August 1981. Ninety-five trainees attended the course; of these, 19 were representatives of various rural development agencies and the rest were village youths from various districts of Jammu province. The course was aimed at equipping villagers with the basic technical knowledge to speed up the diffusion of modern aquacultural practices to the rural areas where potentialities of fish cultivation exist.

The topics discussed consisted of pond construction, varieties of fishes, fish spawning and reproduction, nursery management and care of spawn, fish feeding and nutrition, fish diseases and their control, aquatic ecology, aquatic microbiology, aquatic weeds, and economics of fish culture.

The *kandi* (dryland) areas of Jammu province have rainfed ponds, which cater to the water needs of the populace. With a view to putting these water bodies to economic use, this regional laboratory started the aquaculture programme in 1975. Till early 1981, six varieties of fish had been acclimatized and stocked in 340 village ponds. □

Nuclear Techniques in Ground Water Hydrology

TRAINING COURSE

A training course in Nuclear Techniques in Ground Water Hydrology was conducted at the National Geophysical Research Institute (NGRI), Hyderabad, from 7 to 18 September 1981. Twenty-eight trainees participated in the course, sponsored by the Indian National Committee for International Hydrological Programme, and conducted jointly by NGRI and the Bhabha Atomic Research Centre, Bombay. The trainees, drawn from universities, research institutions and government departments, represented disciplines of geology, geophysics, physics, chemistry, and civil engineering. The course was coordinated by NGRI's Dr R.N. Athavale and BARC's Shri S.M. Rao. □

Analytical Instruments

WORKSHOP

The Central Scientific Instruments Organisation (CSIO), Chandigarh, organizes from time to time training courses and workshops on repair, maintenance and handling of analytical instruments used in various sectors o industrial and research laboratories One such recent workshop, held from 24 to 31 August 1981, was addressed to workers in forensic science laboratories Twenty-two senior-level personnel representing forensic science laboratories from various regions of the country attended the workshop, which comprised lectures, practical demonstrations, laboratory exercises, case studies, group discussions, etc. During 12 technical and demonstration sessions, participants were acquainted with principles, schematic layout, main building blocks, operation, scope and application, care, test and calibration, and interpretation of results from instruments. Parameters relating to specification and limitation of instruments, spares and components normally required to be stacked, and utilization of instruments with emphasis on acquisition, preventive maintenance, fault-finding, trouble-shooting and safety aspects were explained.

Technical films on forensic science techniques as well as several aspects of analytical instrumentation were screened.

Instruments and related techniques covered during the workshop included basic electronics; components and devices applicable to analytical instruments used in forensic science laboratories; test & measuring equipment; tools & devices required for servicing instruments; G-L & G-S chromatographs including paper, thin-layer and high-pressure liquid chromatographs; colorimeters and spectrophotometers in UV, visible and IR ranges; atomic absorption and flame photometers; emission spectrograph; *p*H meters; electrophoresis; electrostatic document apparatus; scanning electron microscope; velocity measuring equipment & high-speed photography; and photostating equipment and duplicating machines.

The topics of special lectures delivered included: role of instrumental analysis in forensic science; role of optics in forensic science and crime in-

vestigation; latest developments in analytical methods applicable to forensic sciences; and care, cleaning and handling of optical components.

The participants were provided an opportunity to have interaction with instruments industry through a working demonstration, by manufacturers, of instruments used in forensic science.

Visits to CSIO, Prototype Centre, as well as Terminal Ballistics Research Laboratory, were arranged.

The course was conducted under the guidance of Dr Harsh Vardhan, CSIO's Director. Shri D.D. Puri, Consultant to CSIO, was convener. Members of the faculty included scientists of CSIO and its Service & Maintenance Centres. □

Conference Briefs

International Congress of Cybernetics and Systems

Prof. A. Ghosal of the Operational Research Group, CSIR Complex, New Delhi, attended, on invitation from the Mexican government, the fifth International Congress of Cybernetics and Systems held in Mexico City from 17 to 22 August 1981. The main objective of the congress, reports the CSIR scientist, was to demonstrate the relevance of cybernetics and systems to the needs of the developing countries.

Prof. Ghosal was chairman of the session on Management Cybernetics, which had two meetings. Presenting a paper entitled 'Some problems in planning via cybernetics' in the session 'Cybernetics of Economic Systems', Prof. Ghosal showed a few models with particular relevance to developing countries which had a high rate of growth but suffered from capital shortage. The planning process has two basic features—forecasting and decisions—each having a feedback effect on the other. Explanation of the growth phenomena of various elements in developing countries through a dynamic logistic model put forward by the CSIR scientist was adjudged highly relevant in most of the developing countries. Papers were presented by delegates from Romania, France, Holland, England, USA, Brazil, Canada, Italy, and other countries. A series of sessions were held in social sciences, in which the Dutch school has done commendable work. Prof. J.L. Elohim, president of the Mexican Association of Systems and Cybernetics, and his associates presented interesting papers in the sessions relating to 'Cybernetics in Education' and 'Philosophical Foundations of Cybernetics and Systems'. There were also sessions on Environmental Cybernetics, Artificial Intelligence, Biological Cybernetics, and Large-Scale Systems. Prof. Ghosal was also a panelist in a session 'Uses of Computers in Developing Countries'.

Prof. Ghosal also delivered a series of lectures on 'Applied cybernetics: management perspectives' in the International Summer School in cybernetics held under the auspices of Mexican Society of Cybernetics, 1-15 August. □

EXTRAMURAL RESEARCH

Pulsed NMR Spectrometer to Study Biological Samples

With the ultimate objective of exploring the possibility of using NMR as a nondestructive diagnostic tool in the detection of cancer, a CSIR research fellow, Shri P. Narasimha Reddy, who worked at the Department of Physics, S.V. University, Tirupati, has designed and constructed a pulsed nuclear magnetic resonance (NMR) spectrometer. The instrument, which works at 12.4 MHz, was fabricated using solid state devices such as transistors and integrated circuits. The signal-to-noise ratio of the spectrometer is about 100. A current-stabilized magnet power supply (90 V; 10 A; with stability of power supply better than 1 in 10^5) was designed and fabricated using solid state devices.

A two-channel boxcar integrator working in single-point mode has been designed and constructed with transistors and integrated circuits. The two channels of the boxcar are identical. The boxcar integrator contains gated integrators with gating time circuitry, analog-to-digital converter and totalizer with digital display. It can be used either as a differential boxcar for measuring the difference of the amplitudes of two signals or as a double boxcar where the signal amplitude is measured in one channel and the base line noise in the other. In the present case, the boxcar has been used in the double boxcar mode. The sensitivity of the boxcar is 5 mV and the linearity is better than 0.1%.

To measure the delay between the pulses in the two pulse sequences, a time interval measuring unit with digital read-out has been constructed. All the circuits were constructed using printed circuit boards, designed and developed in the laboratory.

By using the spectrometer, the spin-lattice relaxation times (T_1) in about 100 human malignant and uninvolved tissues have been investigated. Measurements of T_1 were carried out using $\pi/2-\tau-\pi/2$ pulse sequence. In all the samples studied, T_1 values were higher in malignant tissues than in the corresponding normal ones.

Various factors such as tissue hydration, changes in protein content, physico-chemical state of the cellular water, and conformal state of the macromolecules that affect the T_1 values have been considered to explain the observed longer relaxation times. □

PATENTS FILED

73/Del/81: A process for activating particulate carbon in a rotary kiln by treatment with fluids, P.S. Murti, R.N. Parlikar, T.K. Reddy, G.V. Yugandhar, V. Gawali, S.R.R. Bende & B.P. Rao—RRL, Hyderabad.

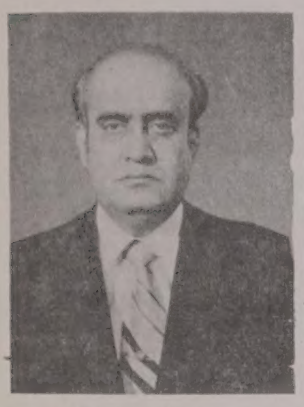
84/Del/81: An open-circuit hydraulic prop for the support of mine roofs with an improved setting and release valve mechanism, A.K. Datta, M.N. Tarafder, P. Roy & S. Bagchi—CMRS, Dhanbad.

98/Del/81: A full bridge strain gauge displacement transducer, Y.V. Ramana & L.P. Sarma—NGRI, Hyderabad.

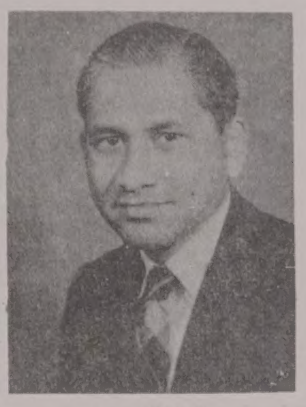
116/Del/81: Process for the extraction and sulphurization of jojoba oil for use as a lubricant, R.R. Mehta, E.R.R. Iyengar & D.J. Mehta—CSMCRI, Bhavnagar. □

Dr Doraiswamy & Dr Bhide win UGC Awards

Dr L.K. Doraiswamy of the National Chemical Laboratory, Pune, and Dr V.G. Bhide of the National Physical Laboratory, New Delhi, are among the ten scientists selected by the University Grants Commission (UGC) for the Hari Om Ashram Awards for the years 1977 and 1978.



Dr Doraiswamy



Dr Bhide

Dr Doraiswamy is recipient of Dr Homi J. Bhabha Award for research in applied sciences for the year 1977. Dr Bhide wins C.V. Raman Award for experimental research in physical sciences for the year 1978.

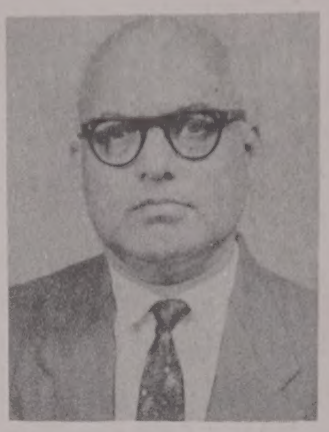
The awards, named after outstanding Indian scientists, carry a cash prize of Rs 10,000. Given by the commission out of the endowment created by the Hari Om Ashram Trust, Nadiad (Gujarat), the awards are administered by UGC. □

PERSONNEL NEWS

Shri C.P. Natarajan retires

Shri Coimbatore Panchanada Natarajan, Director, Central Food Technological Research Institute (CFTRI), Mysore, retired on 30 September 1981.

Shri Natarajan, who headed CFTRI as director since 1 November 1978, is well known for his contributions in the chemistry and processing of plantation products. He is responsible for setting up at CFTRI a school of coffee research devoted to the chemistry and technology of coffee. Under his stewardship CFTRI's researches have opened up new vistas in plantation products. He and his coworkers won the 1977 Rafi Ahmed Kidwai Award for their work on



major spices. Their work has led to processes for preparing oleoresins and essential oils from spices, dehydration of green pepper, and retention of the green colour of cardamom—products which have established export markets. Also to his team's credit stands the technology of flavour blends used in the soft drink 'Double Seven' (now called 'Double Cola').

Shri Natarjan prepared a blue print and programme for establishing the Institute of Food Industries in Sudan. He was member/leader of the Indian delegation to the meetings of the International Organisation for Standardisation on spice/tea, held in Sri Lanka in 1978. His visit to FRG in 1975 resulted in an active programme of cooperation between India and West Germany in R&D in food technology under CSIR-KFA agreement.

He has offered his expertise to several Indian Standards Institution's committees. He has been associated with several learned and professional societies. He was, for instance, president of the Association of Food Scientists and Technologists (1977). He has to his credit more than 200 research papers. □

Dr N. Ramanathan Acting Director of CLRI

Dr N. Ramanathan has been appointed Acting Director of the Central Leather Research Institute (CLRI), Madras, effective 24 September 1981 consequent on Director Prof. M. Santappa relinquishing office to take up vice chancellorship of Madras Universit [*CN*, 31 (1981), 143]. Dr Ramanatha had been Acting Director earlier also from 17 January 1979 to 30 July 198

Among the recent honours which he has received is the fellowship of the Indian National Science Academy.

For an account of Dr Ramanthan's scientific contributions, *see CN*, 29 (1979), 49. □

COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH

Advertisement No. 32/81

The Council proposes to appoint a Scientist F at the Central Electrochemical Research Institute (CECRI), Karaikudi, Tamil Nadu. Research projects in the institute cover various branches of electrochemistry such as batteries, corrosion, electrodeposition and metal finishing, electrometallurgy, etc. The incumbent will be responsible for planning, conducting and coordinating research programmes in one or more of the following areas: (1) Metal finishing, electroplating and anodizing; (2) Energy storage and delivery systems, e.g. fuel cells and batteries; and (3) Basic photo and solid state electrochemistry. He should be able to head a team of research workers and also assist the Director in his administrative duties.

Qualifications: (i) High academic qualifications, preferably a Ph.D. in chemistry/chemical engineering or equivalent. (ii) About 10 years' R&D experience and record of research of proven quality in the specialities mentioned above.

Scale of pay: Rs 2000-125/2-2500 plus allowances at Central Government rates. Higher initial pay can also be considered.

Age: Preferably 50 years, relaxable in special cases.

This is a contractual appointment for six years but the contract is extendable and the incumbent can also be confirmed.

Those interested may send their *curriculum vitae* to the Chief (Administration), Rafi Marg, New Delhi 110001 on or before 26 November 1981 in a prescribed form, which will be supplied on request. □

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